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(54) Title: ANTIFREEZE PROTEINS FOR INHIBITION OF CLATHRATE HYDRATE FORMATION AND REFORMATION

(57) Abstract: Antifreeze proteins, active fragments of these antifreeze proteins and mimetics thereof for use in inhibiting clathrate hydrate formation and reformation and designing and selecting inhibitors of clathrate hydrate formation and reformation are provided.

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 E21B37/06 C10L3/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 E21B C10L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	ZENG H, WILSON L.D. ET AL: "The inhibition of THF tetrahydrofuran clathrate hydrate formation by antifreeze protein" PETROLEUM ABSTRACTS 43/24, ABSTRACT N°811196, 14 June 2003 (2003-06-14), pages 526-530, XP008020507 the whole document & Proceedings of the fourth International Conference on Gas Hydrates, Yokohama May 19-23-2002	1-8, 18, 19
Y	WO 94 25727 A (BP EXPLORATION OPERATING) 10 November 1994 (1994-11-10) page 3, line 4 -page 4, line 6 --- -/--	1-8, 18, 19

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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- * & * document member of the same patent family

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6 008 016 A (WALKER VIRGINIA K ET AL) 28 December 1999 (1999-12-28) cited in the application column 5, line 16 - line 38 column 6, line 15 - line 55 column 27, line 52 - line 65 column 30, line 29 - line 38 -----	1-8, 18, 19
Y	US 5 627 051 A (DUMAN JOHN G) 6 May 1997 (1997-05-06) cited in the application column 1, line 4 - column 3, line 2 -----	1-8, 18, 19

INTERNATIONAL SEARCH REPORT

Information on patent family members

Internat

Application No

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03/00528

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9425727	A	10-11-1994	WO 9425727 A1	10-11-1994
US 6008016	A	28-12-1999	US 6348569 B1	19-02-2002
			AU 726696 B2	16-11-2000
			AU 2883897 A	05-01-1998
			WO 9746674 A1	11-12-1997
			CN 1221450 A	30-06-1999
			EP 0939808 A1	08-09-1999
			JP 2001505404 T	24-04-2001
			KR 2000016268 A	25-03-2000
US 5627051	A	06-05-1997	AU 5981996 A	30-12-1996
			WO 9640973 A1	19-12-1996
			US 5633451 A	27-05-1997